at1121exam_practice: Radicals and Squares (v619)

Question 1

Simplify the radical expressions.

$$\sqrt{98} \qquad\qquad \sqrt{27} \qquad\qquad \sqrt{12}$$

$$\sqrt{7 \cdot 7 \cdot 2} \qquad\qquad \sqrt{3 \cdot 3 \cdot 3} \qquad\qquad \sqrt{2 \cdot 2 \cdot 3}$$
$$7\sqrt{2} \qquad\qquad\quad 3\sqrt{3} \qquad\qquad\quad 2\sqrt{3}$$

Question 2

Find all solutions to the equation below:

$$2(x-4)^2 - 10 = 40$$

First, add 10 to both sides.
$$2(x-4)^2 = 50$$

Then, divide both sides by 2.
$$(x-4)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.
$$x - 4 = \pm 5$$

Add 4 to both sides.
$$x = 4 \pm 5$$

So the two solutions are $x = 9$ and $x = -1$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 16x = -39$$

$$x^2 + 16x + 64 = -39 + 64$$
$$x^2 + 16x + 64 = 25$$
$$(x+8)^2 = 25$$
$$x + 8 = \pm 5$$
$$x = -8 \pm 5$$
$$x = -3 \qquad \text{or} \qquad x = -13$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 12x + 13$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .
$$y = 2(x^2 - 6x) + 13$$

We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.
$$y = 2(x^2 - 6x + 9 - 9) + 13$$

Factor the perfect-square trinomial.
$$y = 2((x-3)^2 - 9) + 13$$

Distribute the 2.
$$y = 2(x-3)^2 - 18 + 13$$

Combine the constants to get **vertex form**:

$$y = 2(x-3)^2 - 5$$

The vertex is at point $(3, -5)$.